# Commonwealth of Virginia


# Information Technology Resource Management Policy

# Systems Development and Maintenance



Council on Information Management

# Preface

**PUBLICATION DESIGNATION**
COV ITRM Policy 91-1.

**SUBJECT**
Information systems development and maintenance.

**EFFECTIVE DATE**
January 1, 1992. All state agencies shall be in full compliance with the provisions of this policy by July 1, 1992.

**SUPERSEDES**
Department of Management Analysis and Systems Development COV DP Standard 82-1, Directive 82-3, and Guideline 83-1.

**AUTHORITY**
*Code of Virginia*, § 2.1-563.31 (Powers and Duties of the Council on Information Management).

*Code of Virginia*, § 2.1-563.17 (Powers and Duties of the Department of Information Technology).

**SCOPE**
This policy is applicable to all state agencies and institutions of higher education (hereinafter collectively referred to as "state agencies") that are engaged in such functions as planning, managing, developing, purchasing and using information technology resources in the Commonwealth.

**PURPOSE**
This policy defines responsibilities and requirements for managing and controlling systems development and maintenance of information systems.

**OBJECTIVES**
The objectives of this policy are to:

- Establish the requirement that all state agencies have written standard(s) relating to the management, systems development and maintenance of information systems.
- Establish state agency responsibilities relating to end-user computing.

**DEFINITIONS**
**Information Systems** are the application programs and databases used by state government to carry out its responsibilities.

**Systems Development** refers to all actions, functions or activities performed by state agencies for the purpose of defining, acquiring, developing, enhancing, modifying, testing, or implementing information systems.

**Maintenance** refers to the necessary activities needed to maintain or improve the functionality, efficiency and effectiveness of existing information systems.

**Enhancement** refers to those activities needed to create new, or change existing inputs, outputs or processing capabilities to enhance or improve an existing information system's usefulness and functionality.

**End-user Computing** refers to automated applications developed by individuals or small groups and intended primarily to support the needs of the individual(s) developing the applications. These applications generally, but not exclusively, use microcomputers, workstations or minicomputers. Instructional and research applications conducted in educational institutions often fall within the scope of end-user computing. *Despite their relative size, these applications cannot be assumed to be strategically unimportant to the Commonwealth or free of risk if improperly developed and maintained.*

**Systems Development Tools and Techniques** refer to specific strategies or standardized methods or procedures to guide the execution of one or more systems development tasks. Prototyping, joint applications design, structured analysis and design, information engineering, object-oriented design, reverse engineering, and structured programming are examples of systems development methods. Computer-aided software (or systems) engineering (CASE) products, fourth-generation languages, and data dictionaries are examples of automated tools and enabling technologies that are used in conjunction with the methodologies.

**GENERAL RESPONSIBILITIES**

In accordance with the *Code of Virginia*, the following provisions apply:

***The Council on Information Management (CIM)***

Responsible for:

Directing the development and promulgation of policies, standards, and guidelines for managing information technology resources in the Commonwealth.

***Advisory Committees***

Responsible for:

Meeting, conferring with, and advising the Council in the development of the Commonwealth's policies, standards, and guidelines for managing information technology resources.

***The Department of Information Technology (DIT)***

Responsible for:

Providing administrative support to the Council and performing such other services as the Council may direct in the performance of its powers and duties. Support may include advising the Council in the development, interpretation, and dissemination of its policies, standards, and guidelines, and maintaining records thereon for the Council.

***All State Agencies***

Responsible for:

Cooperating with the Council in the performance of its powers and duties; and

Complying with the Council's policies, standards, and guidelines for managing information technology resources in the Commonwealth.

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# SECTION 1

# INTRODUCTION

In 1982 the Commonwealth adopted a standard for a systems development life cycle (SDLC) that was applicable to all state agencies and was intended to cover all types of systems development projects. In mid-1983 a guideline containing examples of systems documentation needed to meet the 1982 standard was published. The standard and guideline remained in force through the 1980s and were used as the principal basis for both project management and post-audit of a project's design and implementation.

The 1982 SDLC was developed for large complex projects intended primarily for mainframe central computer environments. During this period applications were developed almost exclusively by technical specialists, with limited and highly structured user involvement in the development of systems. Documenting the development process was usually manual and laborious.

By the middle of the 1980s two major events occurred which changed the systems development environment. First, desktop microcomputers using relative inexpensive commercial software became prevalent in state government. Employees with only limited technical training could use commercial software such as spreadsheets, database systems, statistical packages, graphics and word processing to perform many of the simpler computing tasks previously carried out by mainframe systems. Some employees also ventured into simple programming using software for the microcomputer. Over the last half-decade microcomputers have increased exponentially in power and sophistication and the number of skilled users has increased as well. In today's environment the microcomputer creates a new set of challenges for systems development efforts which cannot be effectively addressed within the context of the 1982 SDLC.

A second new challenge to systems development emerged in the mid-1980s with the advent of CASE products, which provided automated support for the more rigorous structured analysis and design techniques. Early successes in CASE used computers, primarily microcomputers, to support the analysis and design phases of the traditional SDLC. Subsequently, CASE tools were developed to assist programmers in preparing and generating computer code. Today, a number of vendors offer integrated CASE (I-CASE) products which span most phases of the SDLC. Structured methodologies and automated support for the systems development process affected the traditional SDLC in that it accelerated some phases, collapsed others, and placed an increased emphasis on flexibility in the development process.

The Commonwealth's policies, standards and guidelines for information systems development and maintenance have been updated to reflect the current environment and give appropriate recognition to the changes which have occurred in information technology management.

# SECTION 2

# INFORMATION SYSTEMS DEVELOPMENT AND MAINTENANCE POLICIES

## POLICY ON STATE AGENCY REQUIRED STANDARDS

This policy recognizes that the ultimate responsibility for the management, control, development, maintenance, enhancement and use of information systems rests with the individual state agency. Accordingly, it is the policy of the Commonwealth that all state agencies must adopt written standards for the development, maintenance and enhancement of all information systems not considered to be end-user computing. The purpose of written standards is to ensure that quality, effective and maintainable information systems are developed by state agencies.

This policy also recognizes that the number and type of tasks, activities, deliverables, and management review checkpoints will vary among agencies and projects depending on the size, scope, complexity, operating environment, and the availability of systems development tools and techniques. Accordingly, it is the agency's responsibility to establish standards that ensure that appropriate deliverable products, tasks, and activities are identified at the commencement of each project and used in the development, maintenance or enhancement of the information system. The standards also must ensure that appropriate management review checkpoints are identified at the commencement of each project and are used in evaluating, managing and controlling such projects.

To assist state agencies in establishing standards, guidelines are provided in the form of model standards. The model standards require that appropriate tasks, activities and deliverable products be identified at the commencement of each project. These model standards also identify core (mandatory) deliverable products, tasks, activities and management review checkpoints for large-scope, small-scope, and maintenance/ modification projects and illustrate phased approaches for managing and controlling such projects. The model standards illustrate the minimum description of tasks, activities and management review points sufficient to ensure quality and cost-effective information systems.

State agencies may adopt the following model standards, in whole or in part. Those state agencies that adopt these model standards in their entirety will meet the minimum requirement for written standards required by this policy.

- **Model Standard for Large-Scope Projects** - The Commonwealth's Model Standard For Large-Scope Projects is published as ITRM Guideline 91-3. This model focuses on the deliverables and approvals normally required during the systems development of large and/or complex information systems or projects. This model includes both mandatory and optional components.

- **Model Standard for Small-Scope Projects** - The Commonwealth's Model Standard For Small-Scope Projects is published as ITRM Guideline 91-4. This model focuses on the deliverables and approvals normally required during the systems development of

small, relatively simple information systems or projects. This model includes both mandatory and optional components.

- **Model Standard for Maintenance and Enhancement Projects** - The Commonwealth's Model Standard For Maintenance and Enhancement Projects is published as ITRM Guideline 91-5. This model shall apply after a new or revised information system is accepted for production use in a state agency. It addresses routine and emergency maintenance activities, as well as requests for minor changes or enhancements that are normally required to maintain or enhance existing information systems to continually meet the state agency's information processing requirements. The focus of this model standard is on maintaining or enhancing the usefulness, effectiveness, accuracy and consistency of the information system and its supporting documentation. This model includes both mandatory and optional components.

## POLICY ON END-USER COMPUTING

This policy assigns primary responsibility for oversight, management and control of end-user computing to heads of state agencies.

At a minimum, agency heads must ensure that all employees authorized to have access to computational resources of the Commonwealth be advised in writing of their individual responsibility to consider the risk to the Commonwealth of the improper development or maintenance of information systems under their control. In considering development and maintenance risk, the employee must evaluate the reliability, security and integrity of the information system, including all associated data. Employees authorized to have access to computational resources should be aware of and abide by relevant portions of the Commonwealth Policy on Information Security (COV ITRM Policy 90-1) and associated standards and guidelines. Employees authorized to develop or perform maintenance on end-user information systems should ensure that any such system is adequately tested and that sufficient documentation is available to allow a reasonably prepared individual, other than the developer, to understand, evaluate and, if necessary, operate and maintain the information system. For purposes of this standard, use of commercial software which displays on command the content of fields, cells and similar features will be assumed to satisfy minimum documentation requirements. However, agency heads are encouraged to have additional documentation requirements if considered necessary.

Agency heads are encouraged to prepare and maintain an inventory of end-user information systems within their agency which are considered critical to the agency's operations, and to take appropriate steps to cross-train staff on these critical applications.

End-user computing systems development, maintenance and enhancements efforts may also benefit from the application of systems development methodologies.

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**ELECTRONIC COPIES OF COV ITRM GUIDELINES 91-3, 91-4, AND 91-5**
**(for selective word processing packages)**
**MAY BE OBTAINED BY CONTACTING:**

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Council on Information Management
Washington Building
Suite 901
1100 Bank Street
Richmond, VA 23219

Telephone: SCATS 225-3622/(804) 225-3622